

VISION IS TRANSFORMING TEST AND EVALUATION

Mike Cast

Introduction

The events of September 11, 2001, gave tragic emphasis to the urgent need for U.S. military forces that are rapidly deployable, able to operate in urban terrain as well as rugged landscapes, light but lethal, and prepared to conduct a full spectrum of operations—from combat to humanitarian aid. Some of the Army's senior leaders have understood this need for some time, a fact that Army Chief of Staff GEN Eric K. Shinseki underscored when he officially announced the Army transformation campaign at the Association of the United States Army Conference in October 1999.

This transformation is not only resulting in revolutionary changes in force configurations, doctrine, logistics, and training, but in the fielding of new weapon systems and other equipment. Some of the systems and equipment will come from off-the-

shelf commercial sources, some are under development, and some are still just concepts. The reliability of these systems will depend heavily on state-of-the-art technologies, both hardware and software. Testing and evaluating these new systems, and correcting problems as early as possible in their developmental stages, will be critical.

Transformation Of Testing

An innovative transformation of the Army's test and evaluation capabilities is occurring hand in hand with the Army transformation, says Dr. David Brown, Director of Test and Technology at the Army Developmental Test Command (DTC), Aberdeen Proving Ground (APG), MD. Brown also notes that the developmental-testing component of the new Army Test and Evaluation Command is continually striving to improve its test technologies to cap-

ture the best data it can and to provide it to test customers as soon as possible. The command is also working to streamline test schedules, reduce costs, and keep pace with the Army transformation through technology initiatives such as the Virtual Proving Ground (VPG), which integrates live testing with modeling and simulation technologies and high-performance computing to support test programs.

VISION For Future Testing

One of DTC's innovative programs is the Versatile Information System-Integrated ONLINE (VISION), which uses state-of-the-art data-collection technologies. With the aid of a digital data library accessible to test customers through the Internet, VISION gives the Army quick access to critical information on which to base acquisition decisions.

VISION employs a variety of "intelligent" instruments known as Advanced Distributed Modular Acquisition Systems, developed by a team of engineers at DTC's Aberdeen Test Center (ATC) in Maryland to collect diverse test data. These data include engine fluid temperatures, power output, engine speed, shock and vibration, stresses and strains on gears and equipment, gun accuracy, and other data used to pinpoint problems.

During the early stages of the Army transformation, when Initial Brigade Combat Teams were being established at Fort Lewis, WA, VISION provided performance information about vehicles brought to ATC for a bid-sample evaluation. The Army's source-selection board used this information in selecting the Light Armored Vehicle III as the basis for



DTC checks the performance and safety of vehicles.

infantry-carrier and mobile-gun-system variants of the Army's Interim Armored Vehicle (IAV) (now named Stryker). The IAV, which the Army plans to field in 2002, will be the operational mainstay of the brigade combat teams.

To demonstrate the value of the VISION Program, a team from ATC traveled to Fort Lewis in January 2002 to equip vehicles on loan to the Initial Brigade Combat Teams with instrumentation to record a variety of performance data. This information will help the Army further adjust its test program and make any needed improvements to the IAV and other future systems the Army develops.

The data recorded by this instrumentation was relayed to ATC via VISION technology and uploaded to the VISION Web site. ATC engineers envision similar "smart" instrumentation being built into military systems, thus enabling testers, operators, and other decisionmakers to acquire a variety of performance and logistic data.

FCS Virtual Testing

As its Interim Force takes shape, the Army is also looking into creating an Objective Force by 2010. This force will represent what can be done to equip, organize, and train units to assimilate the best aspects of the heavy, light, and interim forces. In tandem with this effort, the Army also teamed with the Defense Advanced Research Projects Agency to entice creative weapons developers into formulating concepts for its proposed Future Combat Systems (FCS). FCS is conceived as a networked "system-of-systems" that will include robotic reconnaissance vehicles and sensors; tactical mobile robots; mobile command, control, and communication platforms; networked fires from futuristic ground and air platforms; and advanced 3-D targeting systems operating on land and in the air. If the Army decides by FY03 to go forward with this concept, the goal will be to equip the first unit with FCS by FY08 and reach initial operational capability by FY10.

"One of the integral parts of Army transformation is a distributed warfighting capability," Brown explained. He added that the FCS will not be a single system where all of its capability is integrated into a single vehicle or item. The Army can't get everything at a single test center at a single time, so it must be able to simultaneously link multiple test centers and capabilities across the country, including contractor capabilities and traditional test sites, typically Army ranges. The Army must be able to stimulate some sort of scenario across them, and that's where the VPG comes in.

The Army must also be able to collect data and save time in a distributed fashion. That means it must have smart sensors and instrumentation systems on various pieces of a system and be able to reconfigure and control them from afar. No longer will testers, data collectors, or anyone else in the chain be with the system; they could be thousands of miles away.

Testers and data collectors must also be able to query instrumentation and get data. The data must be sent right off the system as rapidly as possible, or almost instantly get into some sort of "wire-neutral" communication system—via satellite links, cellular links, or high-speed data links. That's where VISION comes in.

Virtual Information

As the Army's premier center for testing tracked and wheeled land combat systems, ATC developed VISION primarily to capture and share test data on these types of systems, says Dr. Samuel Harley, an ATC Scientist who was instrumental in developing the program. He adds that because VISION can also be configured for use on missiles, aircraft, and other types of systems under test, it will be a valuable commodity for use in DTC's entire test program.

The data collection devices are small enough in size, large enough in processing power, low enough in power consumption, and robust enough to function for extended

periods in any harsh environment in which the military might operate. They share a common device architecture, making it relatively easy to add devices as new requirements surface. The Army is looking at embedding these ruggedized data-collection devices into equipment when it is manufactured—to get diagnostic information from the developmental phase, through operational testing, to actual use in combat.

While VISION is founded on these data-collection devices, its capstone is the digital data library, which test customers and other authorized users can access via the Internet to pull information from disparate databases. This library is not fully developed but will eventually include a separate database of meta-data, which is information tagged to facilitate searches for specific types of test data from all the databases linked into the library.

Information Engineering

Harley terms ATC's effort "information engineering," which is determining what users need and building systems that meet those needs. ATC is using the VISION Program to continue its development of data-collection instrumentation and to integrate developmental and operational testing.

During the next several years, the VISION Program will undergo continuous improvement with the addition of new capabilities. ATC is also working on the program with other test centers and expects to develop an integrated communications hierarchy.

MIKE CAST is a Public Affairs Specialist with the Army Developmental Test Command at APG. He has a B.A. degree in journalism from Arizona State University. For nearly 20 years, Cast has held various Army positions in writing, editing, and photography.
